Fig. 1

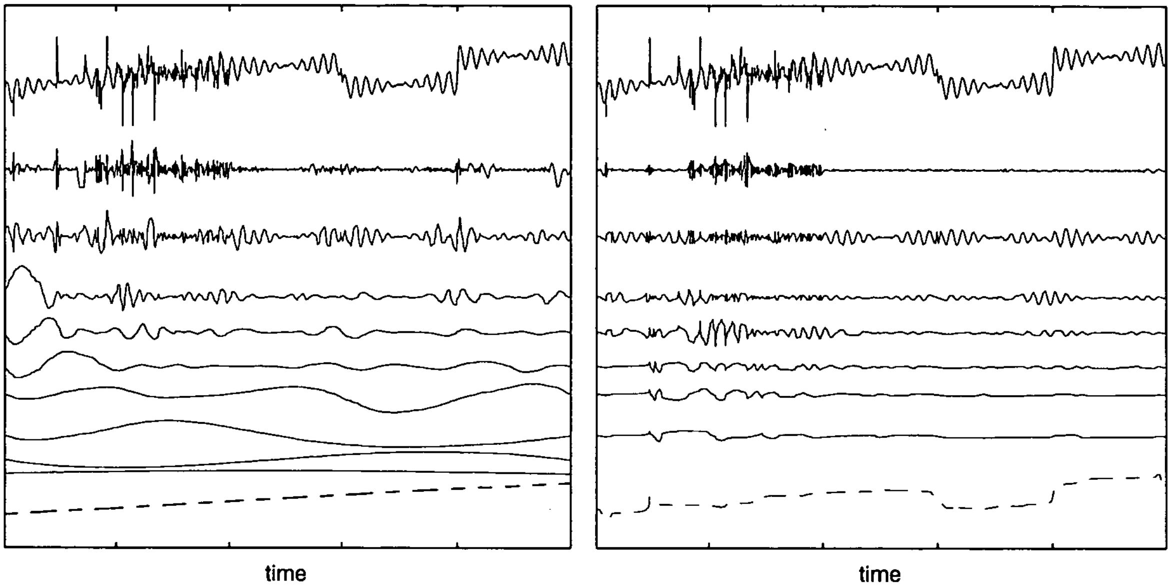


Fig. 2

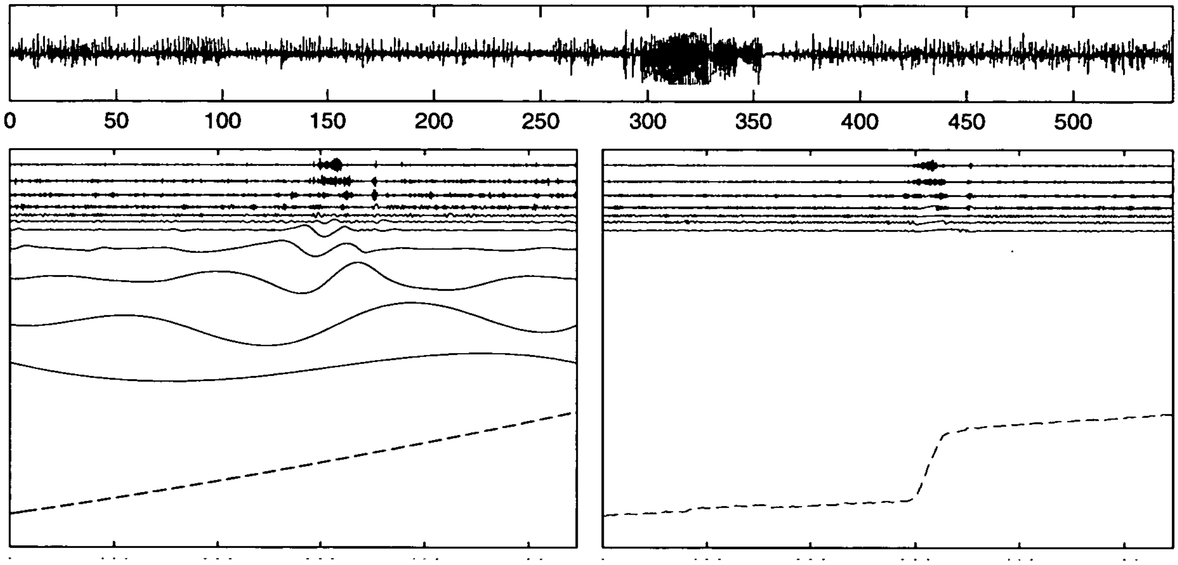
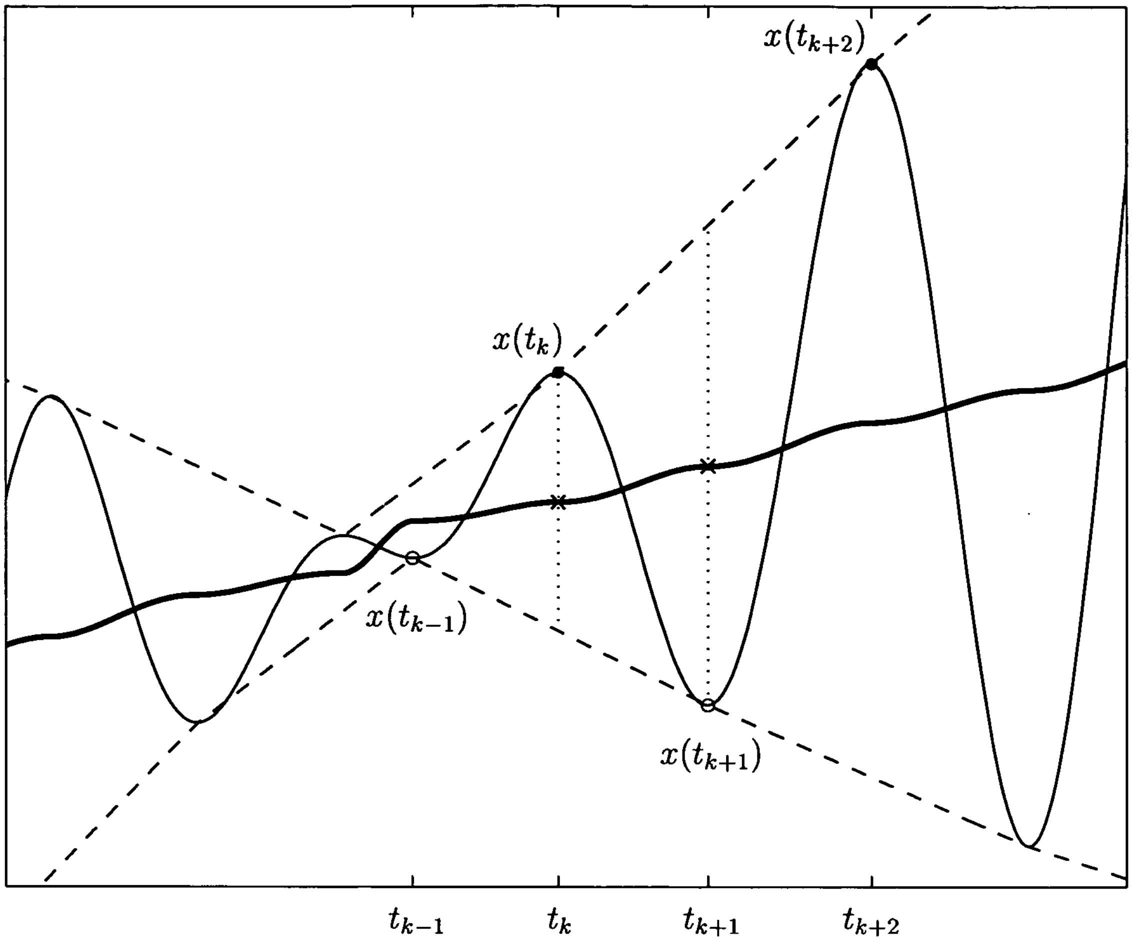


Fig. 3



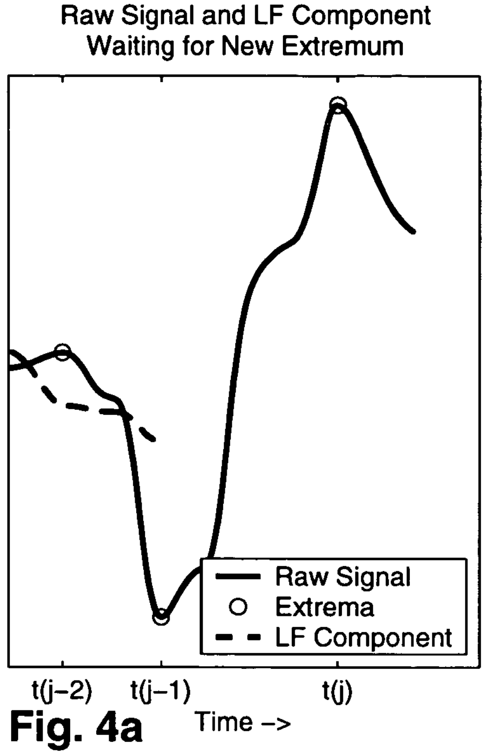

Raw Signal and LF Component Waiting for New Extremum

Fig. 4a

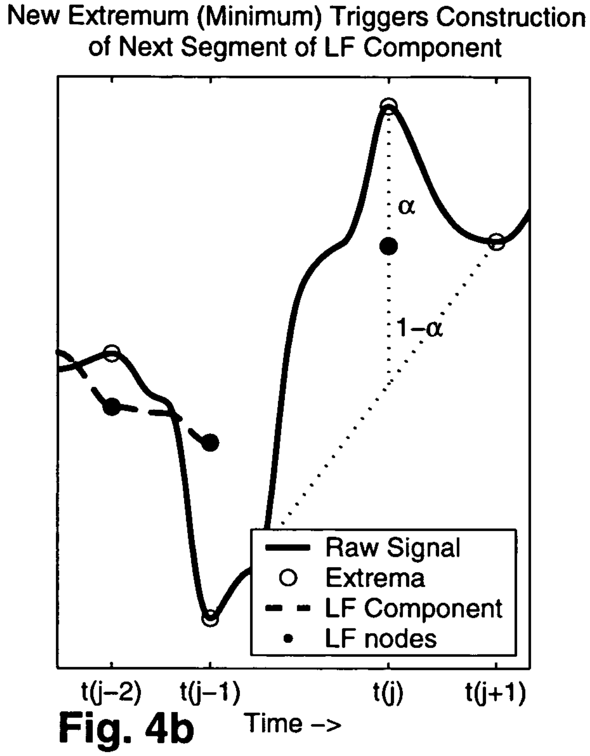

New Extremum (Minimum) Triggers Construction of Next Segment of LF Component

Fig. 4b

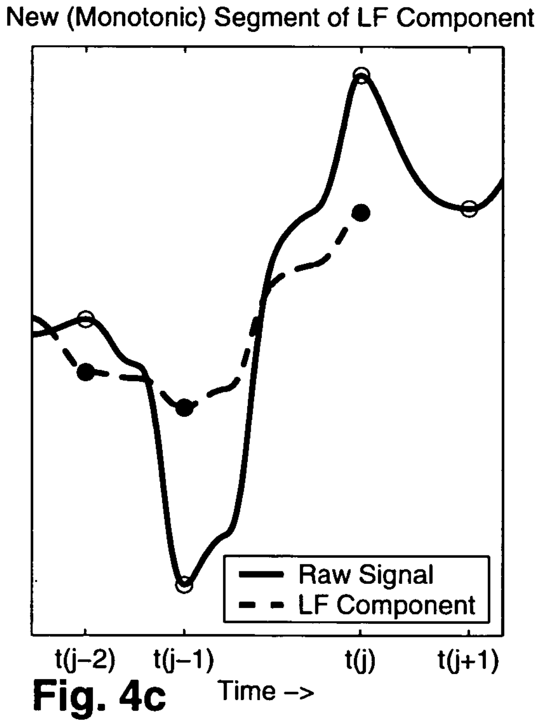

New (Monotonic) Segment of LF Component

Fig. 4c

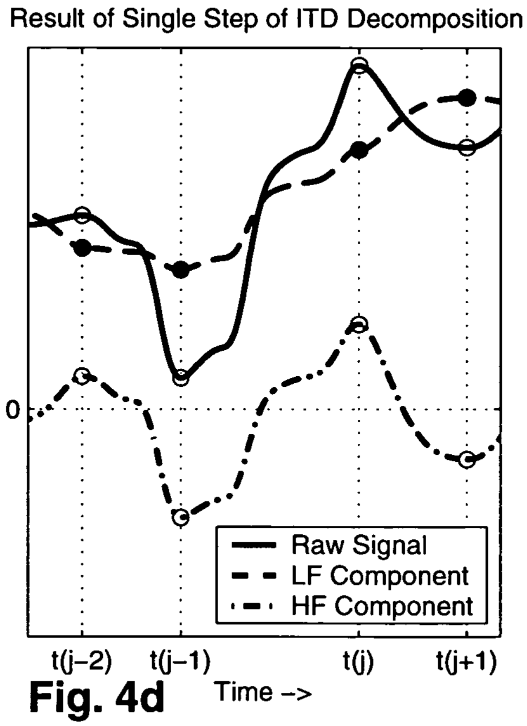
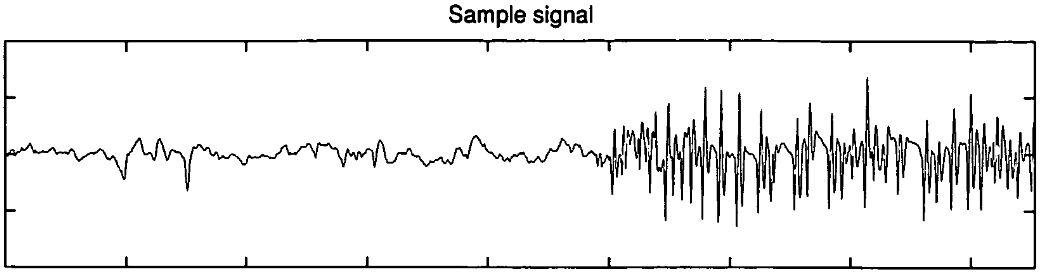
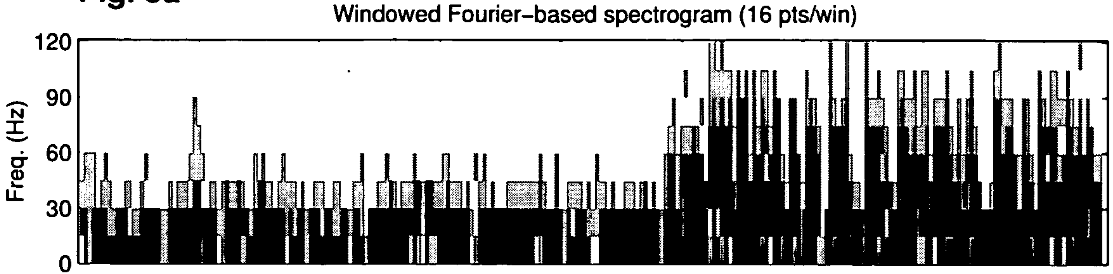

Result of Single Step of ITD Decomposition

Fig. 4d



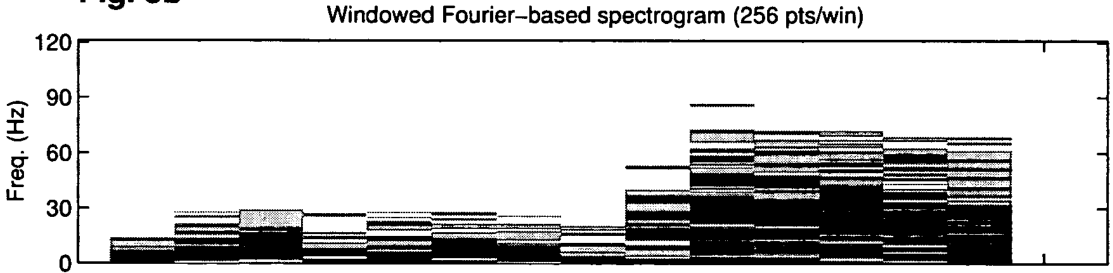
Sample signal

Fig. 5a



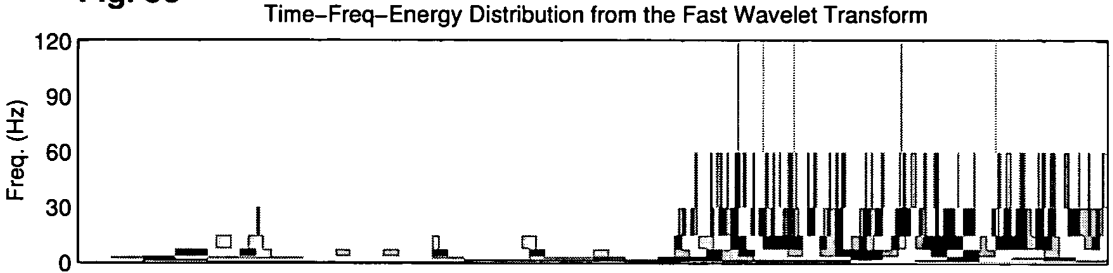
Windowed Fourier-based spectrogram (16 pts/win)

Fig. 5b



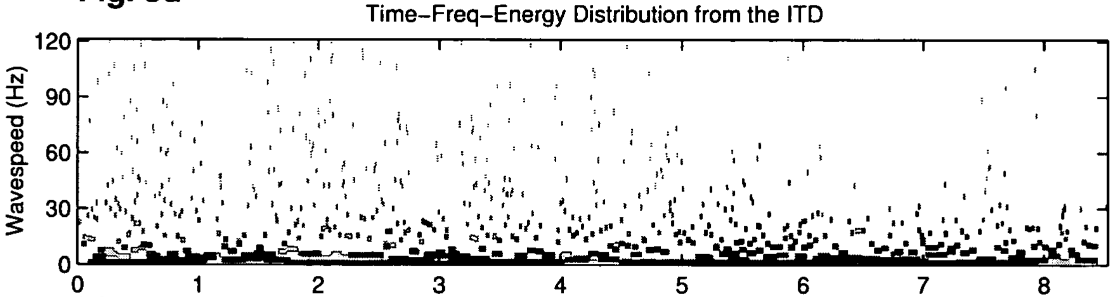
Windowed Fourier-based spectrogram (256 pts/win)

Fig. 5c



Time-Freq-Energy Distribution from the Fast Wavelet Transform

Fig. 5d



Time-Freq-Energy Distribution from the ITD

Fig. 5e

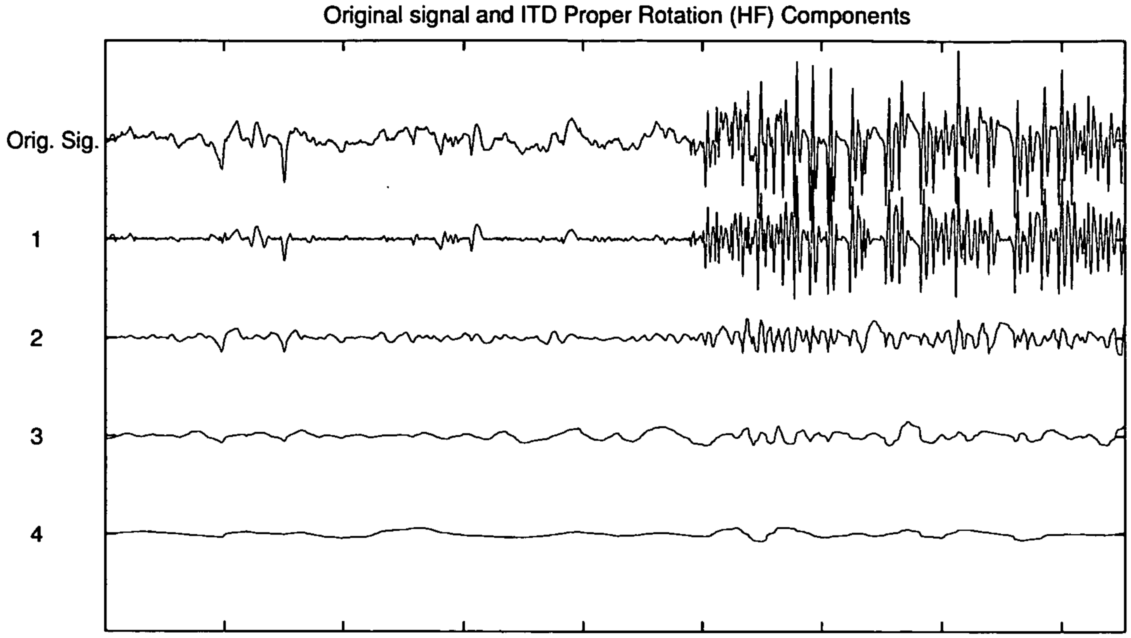

Original signal and ITD Proper Rotation (HF) Components
Orig. Sig.
1
2
3
4

Fig. 5f

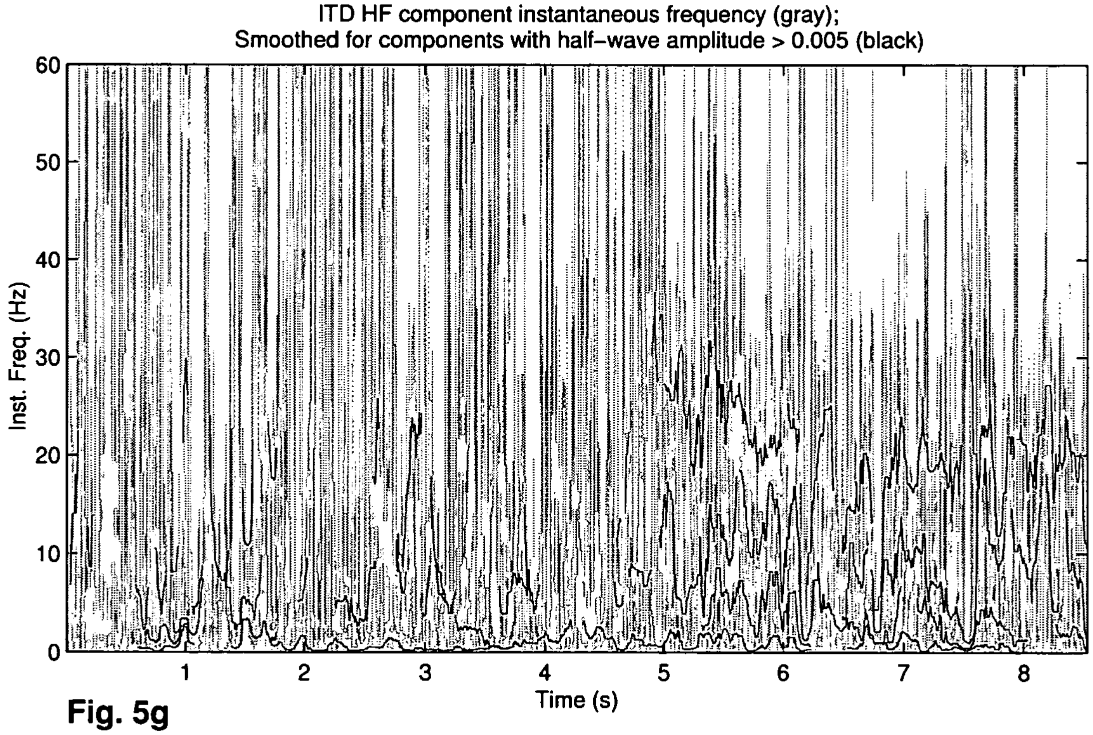

ITD HF component instantaneous frequency (gray);
Smoothed for components with half-wave amplitude > 0.005 (black)
Inst. Freq. (Hz)
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
Time (s)

Fig. 5g

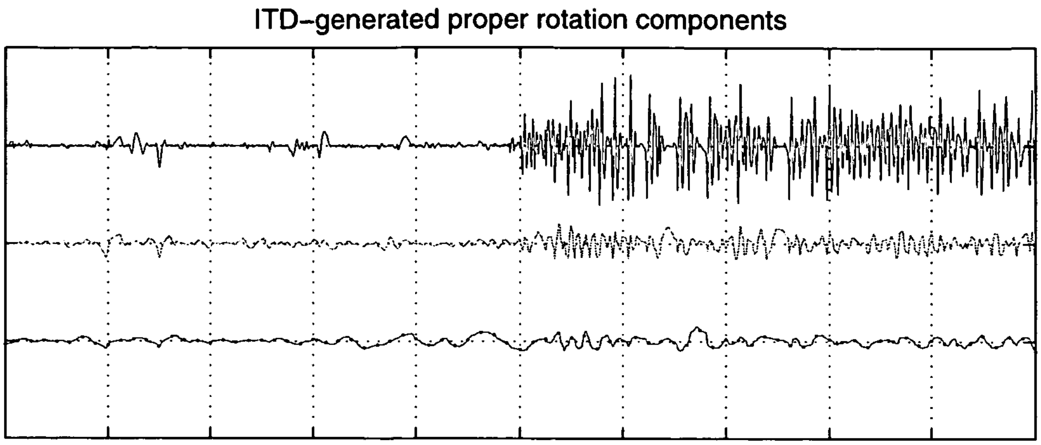

ITD-generated proper rotation components

Fig. 5h

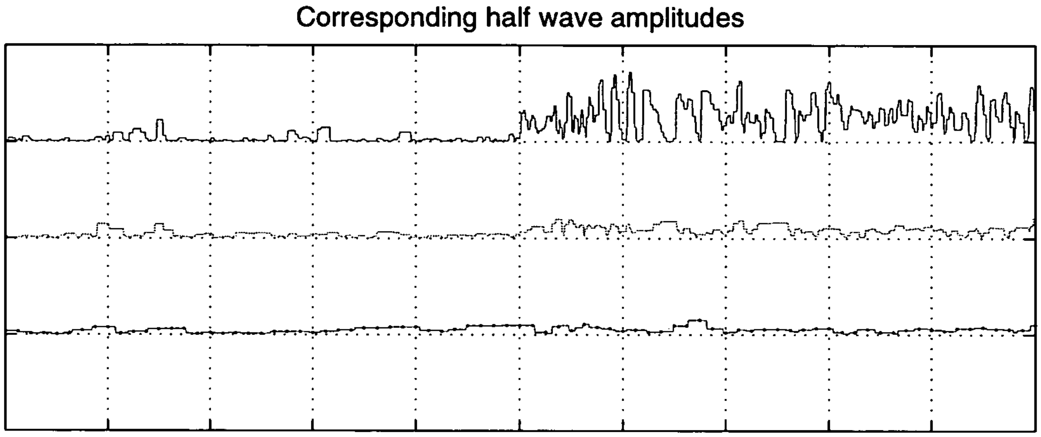

Corresponding half wave amplitudes

Fig. 5i

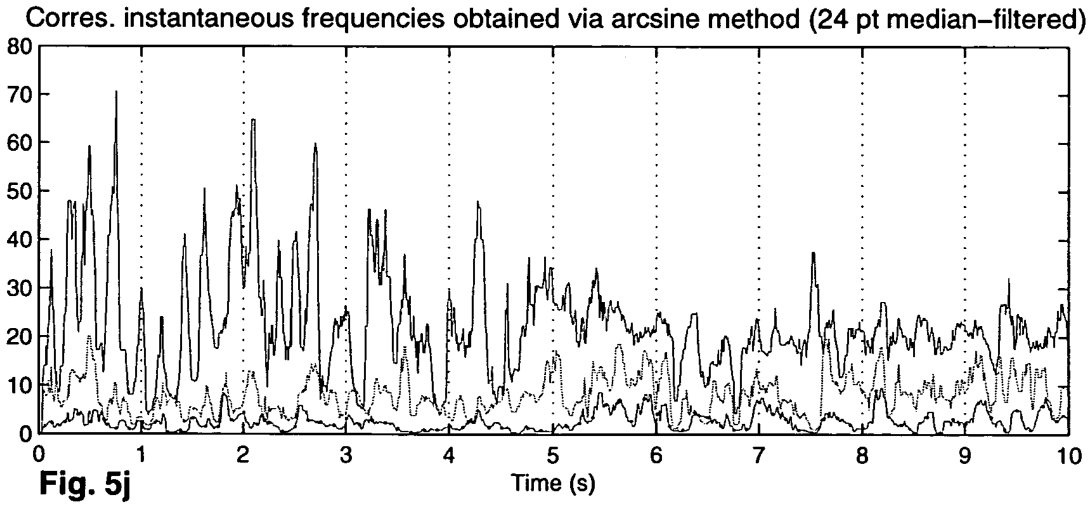

Corres. instantaneous frequencies obtained via arcsine method (24 pt median-filtered)

Fig. 5j

Fig. 6a

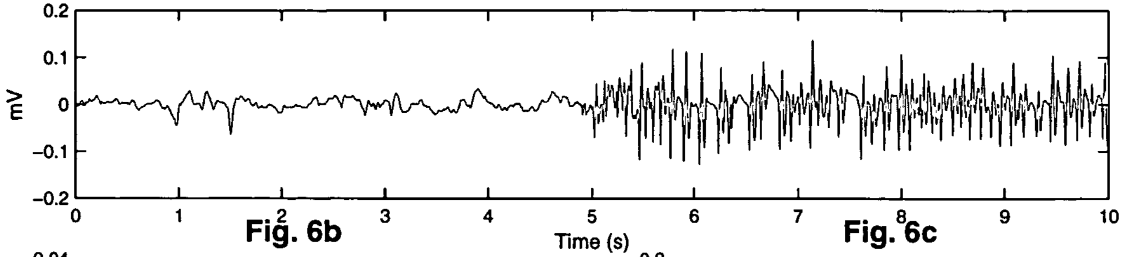


Fig. 6b

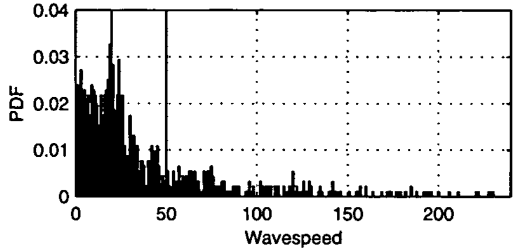


Fig. 6c

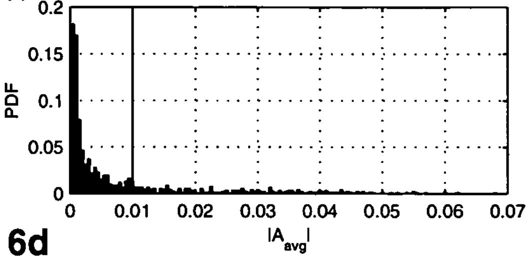


Fig. 6d

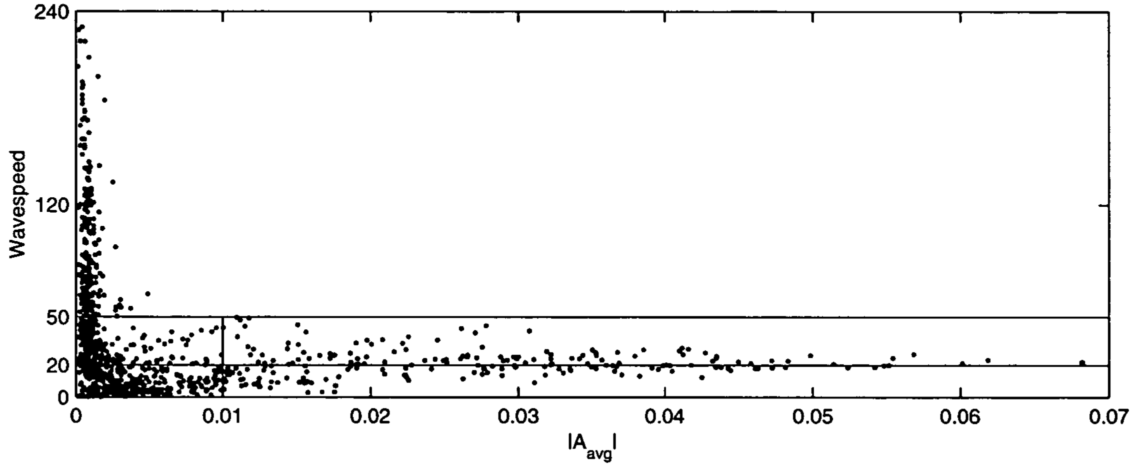
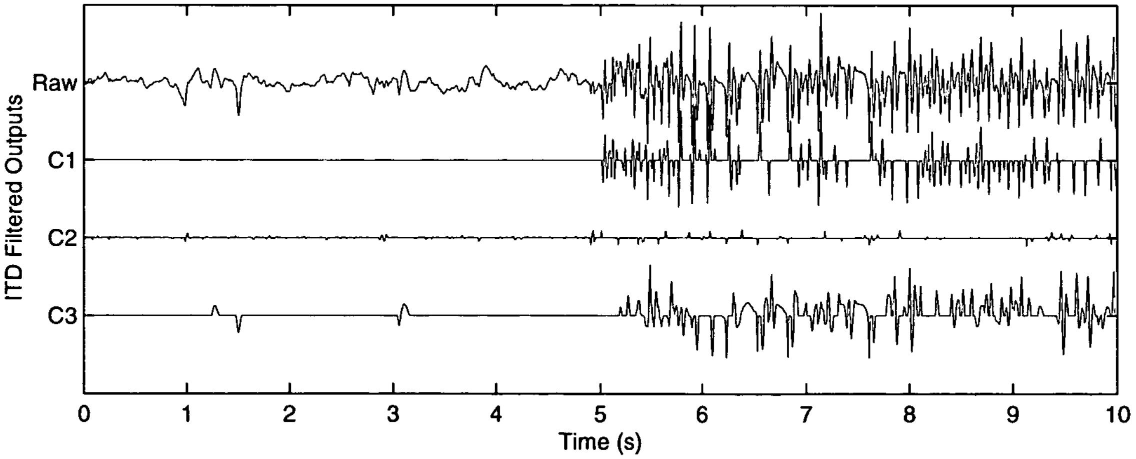


Fig. 6e



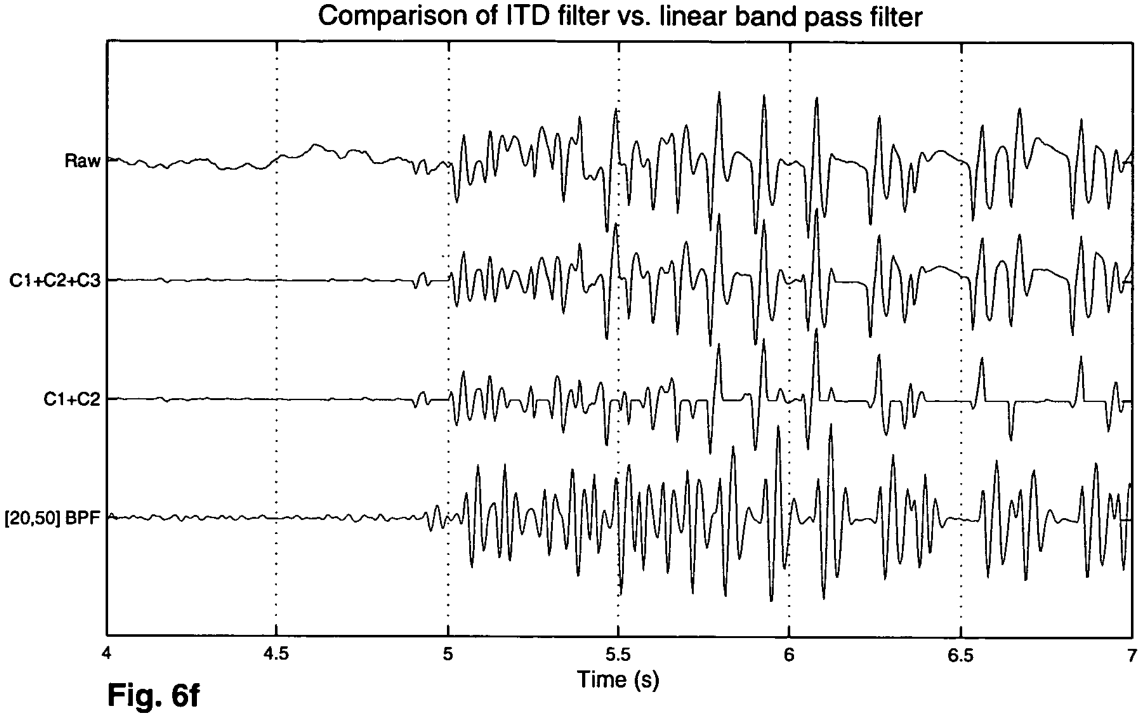

Comparison of ITD filter vs. linear band pass filter
Raw
C1+C2+C3
C1+C2
[20,50] BPF
4
4.5
5
5.5
6
6.5
7
Time (s)

Fig. 6f

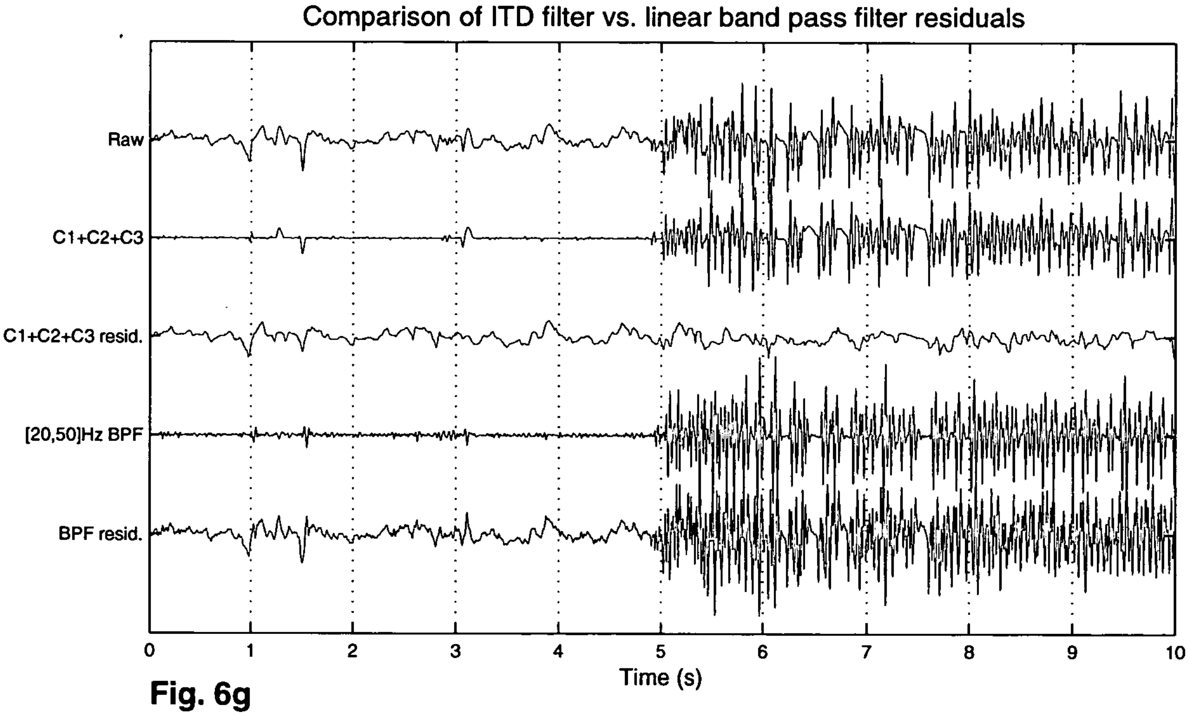

Comparison of ITD filter vs. linear band pass filter residuals
Raw
C1+C2+C3
C1+C2+C3 resid.
[20,50]Hz BPF
BPF resid.
0
1
2
3
4
5
6
7
8
9
10
Time (s)

Fig. 6g

Fig. 7a

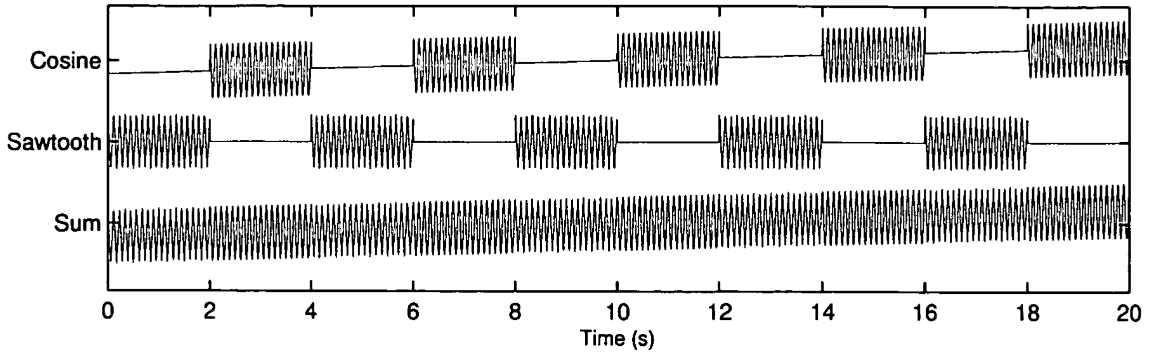


Fig. 7b

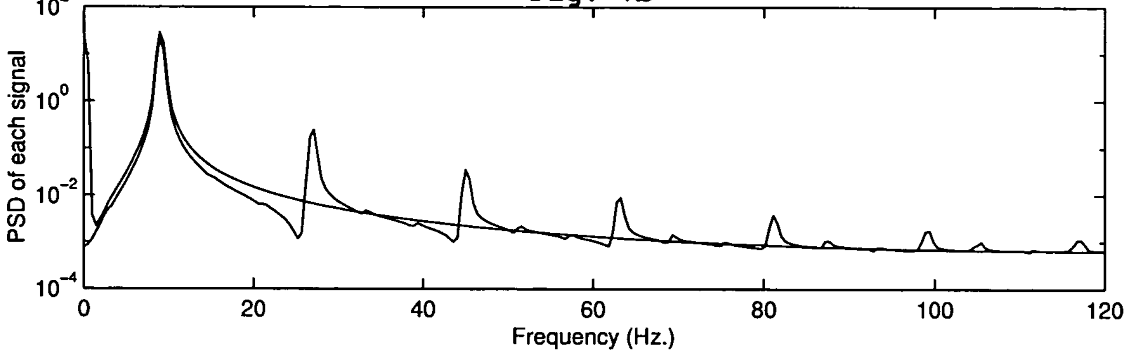


Fig. 7c

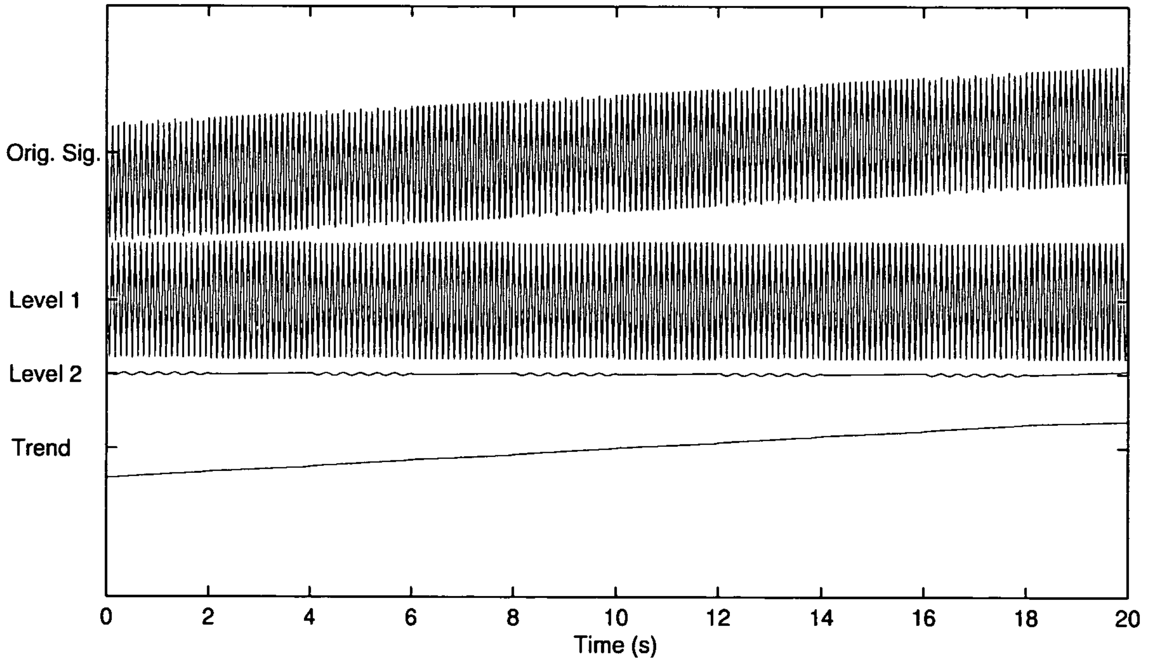


Fig. 7d

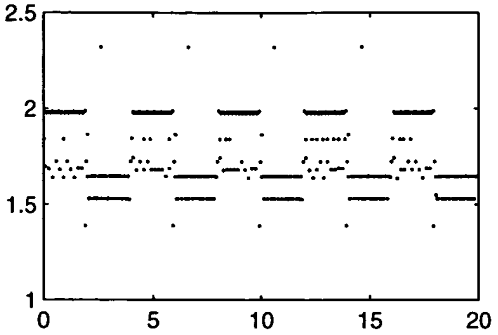


Fig. 7

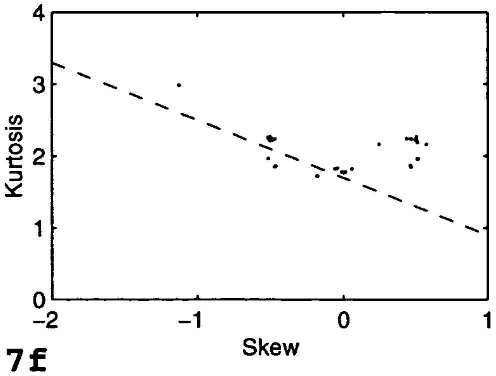


Fig. 7f

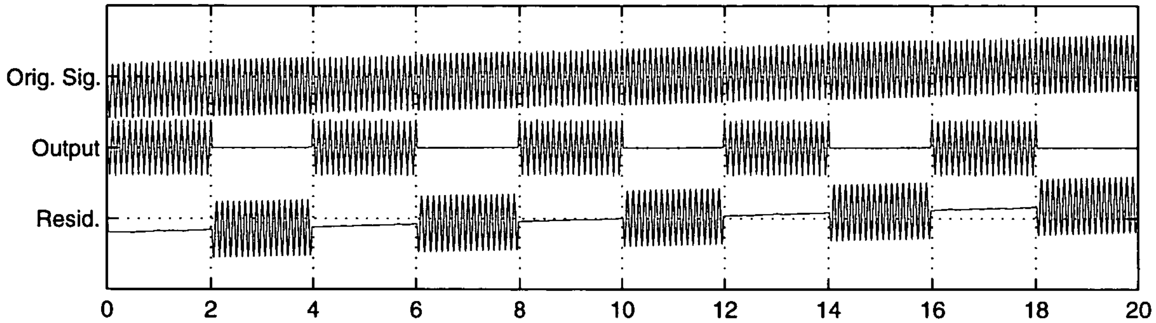


Fig. 7g

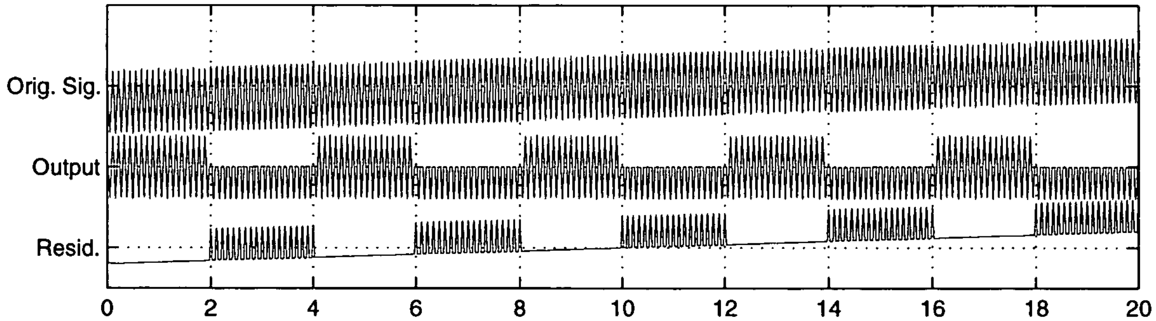
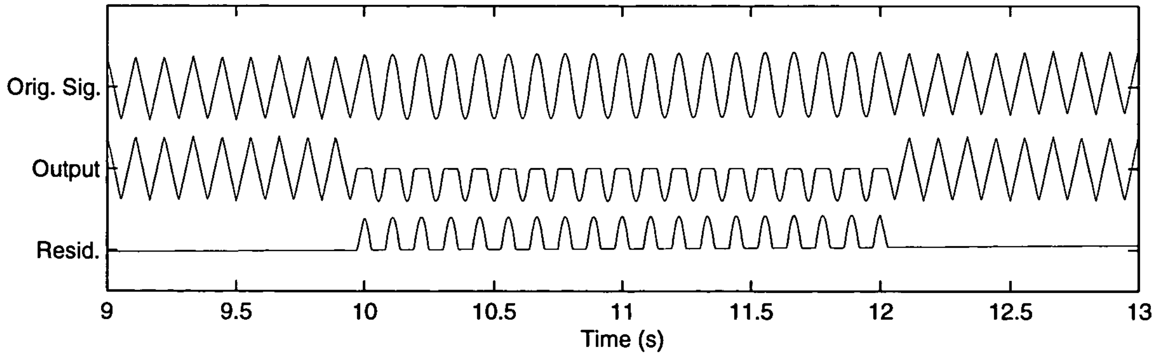


Fig. 7h



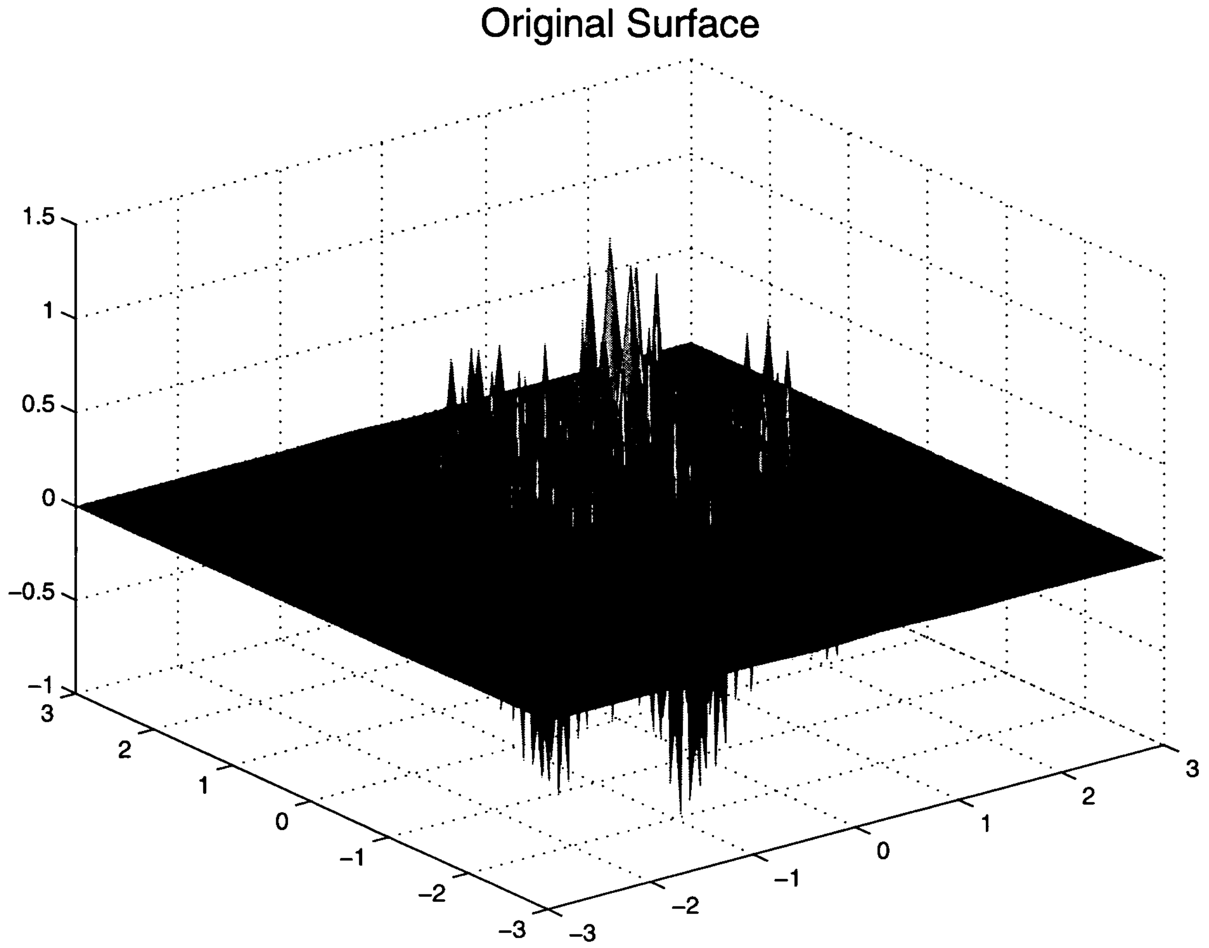


Fig. 8a

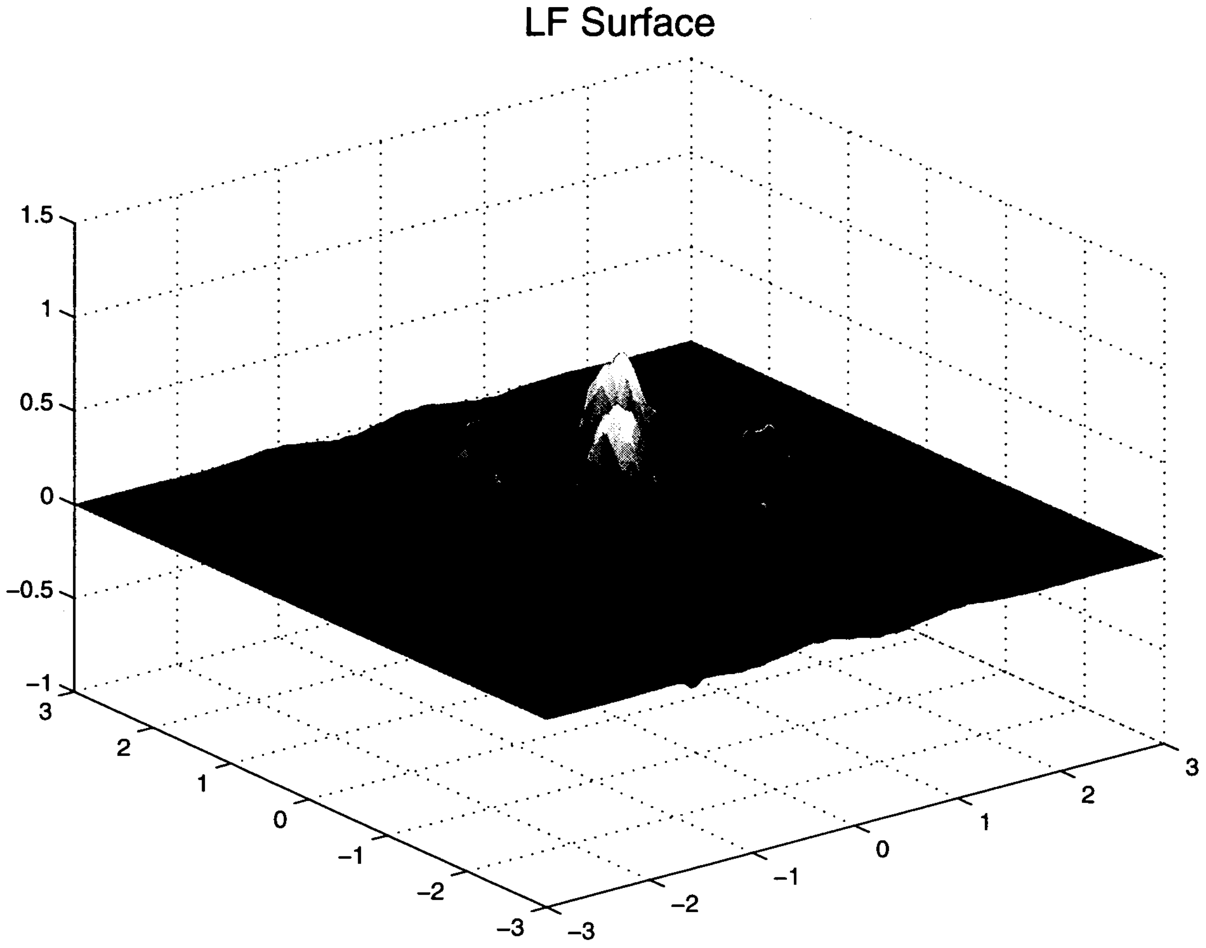


Fig. 8b

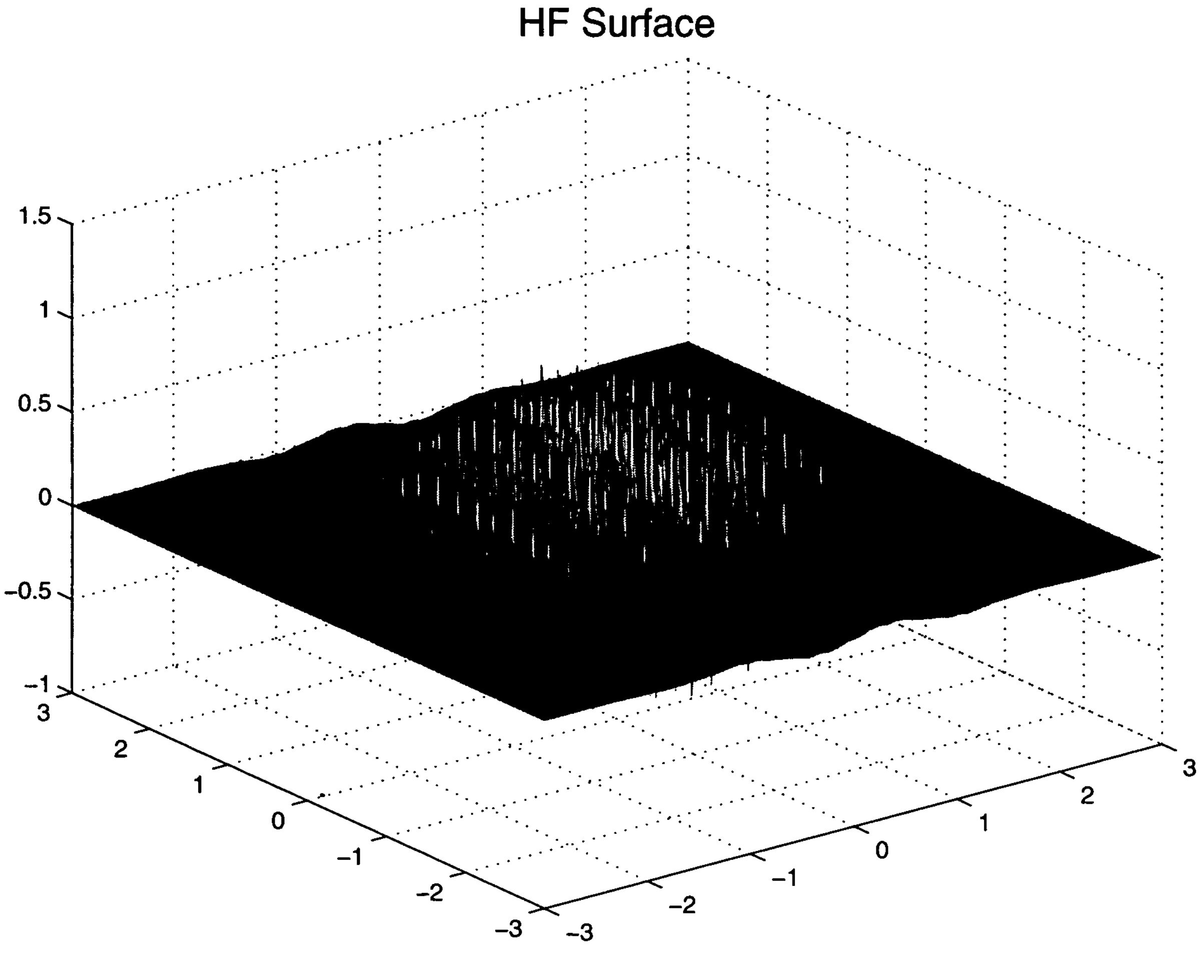


Fig. 8c